SPECIFICATION AMENDMENTS:

Please replace the paragraphs starting on page 1, line 16 through page 3, line 1, with the following amended paragraphs:

--At first, in a waiting state of the conventional photoresist applying device, the photoresist stored in the photoresist bottle 1 is previously filled up to a tip end of the nozzle tip 8 through the various parts ~~of~~ from the buffer tank 2 to the nozzle pipe 7. When applying photoresist to a semiconductor substrate 100 surface, the photoresist is ejected at the nozzle tip 8 by an ejecting operation of the pump 3 and the simultaneous opening/closing operation of the ejection valve 5. Furthermore, by the immediately after continuing sucking operations of the pump 3, photoresist is sucked from the photoresist bottle 1 into the pump 3, to prepare for the next ejection.

Incidentally, in order to prevent photoresist from dripping off the tip end of the nozzle tip 8 after ejecting photoresist, the suck-back valve 6 is in a mechanism to suck photoresist back from the nozzle tip 8 side, which is usually in an integral structure with the ejection valve 5 in many cases. The buffer tank 2 has an operation that, in the case an air bubble is mixed in a supply pipe 7a interior during exchanging the empty photoresist bottle 1, the air bubble is removed from a drain pipe attached on the buffer tank 2 by pressurizing the photoresist bottle 1 with using an N2 gas or the like, and a function to detect a fact the photoresist bottle 1 is emptied of photoresist by a medical-fluid sensor provided on the buffer tank 2.

However, in the photoresist applying device of the above structure, there is a conspicuous problem that air bubbles occur at various ~~pints~~ points of the photoresist flow passage of from the photoresist bottle 1 to the nozzle tip 8 and stay in the photoresist within the pipe 7a. Although this can be considered responsible for gas/liquid separation in the photoresist liquid, the major factor is assumably by the influence of negative pressure as caused by sucking operation of the pump 3 or sucking operation of the diaphragms of the ejection valve 5 and ~~sack-back~~ suck-back valve 6, or natural separation within the filter 4.--

Please replace the paragraphs starting on page 5, line 5 through page 10, line 3, with the following amended paragraphs:

--The photoresist applying device of the first embodiment of the invention is characterized in that an air-bubble collecting part is provided on a photoresist flow passage at its predetermined part of nozzle pipe 7 directly connected to a nozzle tip 8. The nozzle pipe 7 has an external appearance in a shape curved in an inverted U-form (∩). Specifically, the nozzle pipe 7 is structured by a horizontal part A, a rise part B and a fall part C in the order from the suck-back valve 6 side, and structured to provide a nozzle tip 8 at a tip end of the fall part C. By thus structuring the nozzle pipe 7, a curved part 9 is made between the rise and fall parts so that a top dead center 10 in the curved part 9 serves as an air-bubble collecting part. Herein, it is important to design the fall part diameter and length of

nozzle pipe 7 to have an interior bulk of pipe capable of securing a photoresist amount greater than the photoresist amount of ~~once~~ one projection.

Meanwhile, the nozzle tip 8 is provided in a position in the above of a substrate 100 mounting part in the photoresist applying device (above a cup part) and in the center of the substrate 100 surface.

In the below, in the waiting state of the photoresist applying device in a first embodiment of the present invention, the air bubble caused in the photoresist flow passage due to the influence of the negative pressure caused by sucking operation of the pump 3 shown in Fig. 1, sucking operation of the diaphragms of the ejection valve 5 and suck-back valve 6 or natural separation within the filter 4 or the like moves in the photoresist pipe and reaches the nozzle pipe 7. Furthermore, the air bubble moves up in the nozzle pipe 7 toward the inverted U-formed curved part 9 due to its buoyant force, and stays at the top dead center 10 of the curved part 9. Then, during the process of photoresist application onto the substrate 100 surface, the air bubble staying at the top dead center 10 moves simultaneously with ejection of photoresist and moves down toward the nozzle tip 8.

Herein, as described in the above, the air-bubble collecting part is provided on the photoresist flow passage at its predetermined part of the nozzle pipe 7 directly connected to the nozzle tip 8. As a result that, even in case the air bubble moves down by the same distance as the photoresist in an amount of once ejection moves in the nozzle pipe 7, the air bubble comes to a stop at between the

nozzle tip 8 and the top dead center 10 simultaneously with ejection end of photoresist. Thus, there is no possibility of ejection together with photoresist from the nozzle tip 8 onto the substrate 100. The ejection process of photoresist is generally carried out repeatedly at an interval, for example, of 60 seconds. Accordingly, the air bubble in stoppage at between the nozzle tip 8 and the top dead center 10 again moves up reversely toward the top dead center 10 by a buoyant force and stays again at the top dead center 10.

As described above, according to the first embodiment, the air-bubble collecting part is provided on the photoresist flow passage at its predetermined part of the nozzle pipe 7 directly connected to the nozzle tip 8. As a result, the air bubble caused in the photoresist flow passage and stays at the top dead center 10 of the curved part 9 in the nozzle pipe 7 temporarily moves down toward the nozzle tip 8 during ejecting photoresist but again floats up to and stays at the top dead center 10. Thus, there is absolutely no possibility of ejection at the nozzle tip 8 onto the substrate simultaneously with photoresist ejection. Meanwhile, the diameter and length of the fall part (pipe part between the nozzle tip 8 and the top dead center 10) of the nozzle pipe 7 is designed to have a pipe interior bulk capable of securing a photoresist amount greater than the photoresist amount of once projection, thus positively suppressing the air bubble projection.

Accordingly, when spin-coating photoresist ejected onto the substrate 100 surface, there occurs no color unevenness in radial form caused by a path where the air bubble have flowed on the application film. The film thickness variation in

the uneven color region can be prevented in advance from causing a trouble such as circuit performance instability, poor operation or the like due to partial variation of wiring dimensions caused on an integrated circuit during the later integrated-circuit printing process onto a semiconductor substrate surface, for example.

Fig. 3 is a view for explaining a photoresist applying apparatus and application method therefor according to a second embodiment of the invention.

A nozzle pipe 7 is structured by a transparent pipe, e.g. Teflon tube, wherein graduations 11 are provided on a pipe outer wall close to the top dead center 10. The graduations are, for example, at a 2-millimeter interval.

Because the nozzle pipe 7 is a transparent pipe, the air bubble staying at the top dead center 10 is quite obvious in its amount. Herein, because the graduations 11 are provided on the pipe outer wall close to the top dead center 10, the size of the air bubble staying at the top dead center 10 can be visually measured.

As described above, the photoresist applying apparatus and application method therefor according to the second embodiment of the invention provide the following effect.

In the case the amount of the air bubble staying at the top dead center 10 is excessive, there is a need to carry out an air bubble removal operation. By previously defining the amount of the air bubble requiring air bubble removal and measuring an air bubble size with the graduations 11 as required, the necessity for air bubble removal operation can be easily decided.

Fig. 4 is a view for explaining a photoresist applying apparatus and application method therefor according to a third embodiment of the invention.

A curved part 9 of a nozzle pipe 7 is arranged along a jig 12, for example, made of resin or metal in a curved form. At the same time, the jig 12 is provided with graduations 11, in which case the graduations are not directly provided on the curved part 9 of the nozzle pipe 7 itself.

The curved part 9 of the nozzle pipe 7 is fixed and supported by the jig 12. Meanwhile, because there are no graduations on the nozzle pipe 7 itself, the amount of the air bubble staying at the top dead center 10 is measured with the graduations 11 provided on the jig 12.

As described above, the photoresist applying apparatus and application method therefor according to the third embodiment of the invention provides the following effect.

Because the curved part 9 of the nozzle pipe 7 is fixed and supported by the jig 12, the curved part 9 can keep the stable shape without deformation due to aging or any external force or the like. Meanwhile, in the case of measuring the amount of the air bubble staying at the top dead center 10 by the graduations 11 provided on the jig 12, there is no possibility that the air bubble itself be not easily seen by the graduations because of the absence of graduations on the nozzle pipe 7 itself.--